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March, 1960

Volume 37, No. 3

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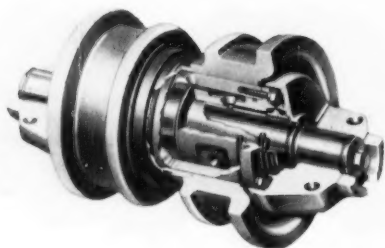
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COAL MINING

Vol. XXXVII March, 1960 No. 3

Contents

Do You Know	5
Here and There In The Coal Industry	5
Learning Something From the Ape	7
Some Dope About Rope	9
Review and Forecast	12
Augering Abandoned Coal In East Kentucky	20
Jeffrey Rope Belt Conveyors	24
Advertisers Index	30

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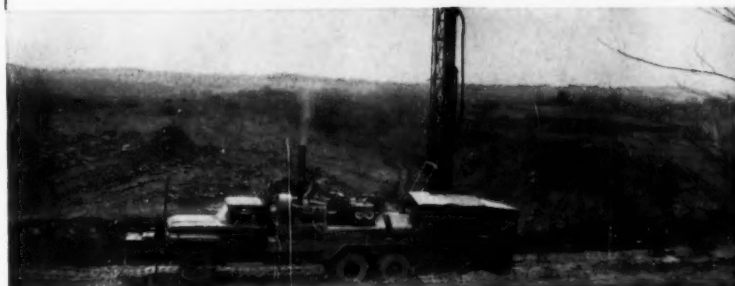
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Daveys can be mounted on any make of truck . . . move fast between blast holes . . . are easy to set in position . . . ideal for low cost drilling. Offered in 8 truck-mounted models with capacities to 3,500 ft. Tractor-mounted drills also available. A-236A

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model	3100 ✓	crawler	2½-Yd.	50 Ton	1¾-2¼ Yd.
model	3500TC	rubber	80 Ton
model	3600 ✓	crawler	3-Yd.	65 Ton	3 Yd.
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Manitowoc Sales & Service Corp. are power shovel and crane specialists with over 30 years' experience in the sales and service of Manitowoc equipment. The company carries no other lines and has no other obligations, preferring to concentrate time and effort in the service of Manitowoc users.

Manitowoc Sales & Service Corp. is located at 878 East High Avenue, New Philadelphia, Ohio, and is currently installing complete parts and service depots at key points throughout the state. We are equipped, stocked and trained to give efficient 24 hour-a-day service to power shovel and crane users throughout the area they will be serving.

Manitowoc Sales & Service Corp. personnel are factory trained specialists with many years of service in the industry . . . well qualified to give crane and shovel users the kind of attention they need. For complete information about the Manitowoc line of power shovels and cranes, contact . . .

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Heated Floors Allow Landers & Griffin,
Inc. To Keep Working All Year On
Route 93 in New Hampshire.

Six Marion units with heated floors from the truck exhaust have made it possible for one contractor to keep going all year in the really cold White Mountain region.

Another six units owned by the contractor but with unheated floors are also on-the-job. All twelve have Model MFR bodies with a capacity of 11 to 12.3 yards. Marion hoists are twin underbody arm type Model HD-88.

Payload performance on the six with heated floors averages 1800 yards per 11-hour shift, traveling both uphill when loaded and in heavy traffic.

The prime contractors, Landers & Griffin, Inc., jointly sponsored with Morrison-Knudsen Co., are building 4.05 miles of Route 93 at an estimated cost of \$2.7 million.

Ed Graves, Equipment Supt., says, "We like Marion bodies and hoists very much. We have used Marion's for a long time and will continue to do so. The service provided by Marion's Distributor is beyond compare."

If you want to keep going and ahead of schedule, why not see your Marion Distributor or write direct for profit facts.

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.



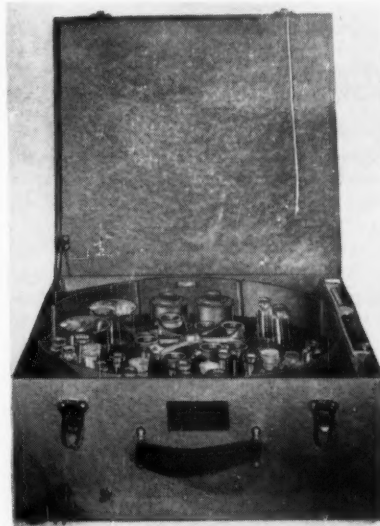
● New Gerin Oil Condition Test

Kit, Model PK4 Can Test Detergent Oils. The Gerin Corporation announces a new Model PK4 crankcase Oil Test Kit, in step with the present day tendency to make lubricating oils with more and more detergency. It is a later development over the widely used Model PK3 which in 1947 first introduced the idea of on-the-job oil testing by men who operate and maintain the engines.

The manufacturer claims an exclusive feature of the Kit, which does not use blotters, is the ability to show the definite amounts of contaminants and deterioration of the oil. The tests show whether to change oil or filter or not to change and whether an engine needs attention because of fuel or water or metal particles found in the oil.

Other features are quickness of the tests and accuracy of results. Any mechanic or operator can test for fuel dilution; water and anti-freeze leakage; acidity; metal particles; dirt; soot; etc. in one to twelve oils at the same time. Users of the previous Gerin Test Kit including Bus and Truck Fleets; Utilities; Railroads; Pipelines; U.S. Navy; Coast Guard and Army will be able to convert their kits to the new features of the PK4.

Bulletin 400 "How To Know What's Going On Inside Your Engines Before It Costs You Money" is available free. The Gerin Corporation, Avon, New Jersey.



Do You Know?

● A "new look" may be in store for the big engineering and scientific meetings that draw many thousands of delegates yearly from all quarters of the U. S.

A report to the Daniel and Florence Guggenheim Foundation explores criticism that these meetings are too frequent, cost too much money, are riddled with duplication and in some cases are eating seriously into working time of employees.

If recommendations in the report are adopted by professional societies, there will be no papers presented that merely seek to sell a product. More slides, charts and models will be used by speakers. If a speaker does not have something significant to say, he will not make the program. Papers may be circulated in advance to persons planning to come, with meeting sessions largely devoted to discussion. Concurrent sessions will be black-listed.

Made by Pendray & Company, Bronxville, N. Y., the report concentrated only on technical meetings in the flight sciences. But in this single area, it was estimated that meetings cost industry 258,000 man-days of working time and \$21,500,000 a year. "Hospitality suites" add an extra \$1,000,000 to \$3,000,000 to the over-all cost. In view of time and money spent on such meetings, their value as a means of communication is being challenged. The study bore out industry's belief that the number of such meetings is increasing.

Despite this, the report said, "It is a real question whether the process of disseminating technical information as presently practiced is good enough for our rapidly changing and burgeoning times."

A group of companies were surveyed, of which 67% said there are too many meetings and 85% said there is considerable overlapping and duplication in technical society programs. But comparison of papers and authors showed little duplication, the report said.

Of eight professional societies surveyed, seven conceded receiving complaints from members on number and quality of meetings. The eighth, the Institute of Radio Engineers, declared it had not received a single such complaint, although admitting that some "careless talk" along these lines had been heard.

* * *

● A new insulation material may be painted or sprayed on electrical equipment subject to high-voltage discharges that cause rapid breakdown of conventional insulating materials. Described by its developer, Westinghouse Electric Corporation here, as a resin of the epoxy

HERE AND THERE IN THE COAL INDUSTRY

● David L. Francis, president of Princess Coals, Inc., has announced purchase of the Sewell Coal Co., which operates the Panther Mine at Maryhill, W. Va., effective Feb. 12. Mr. Francis said output of Sewell Coal from this mine and other Princess properties will amount to one million tons per year.

"In uniting these two companies, we have brought together substantial reserves of some of the finest high-grade, by-products, medium volatile coal in the country," Mr. Francis said.

The Sewell Coal Co. will retain its identity as a wholly owned subsidiary of Princess Coals, Inc., but will operate within the organization as the Sewell Division, consisting of the Sterling Sewell and Panther Mines, under William Crawford, vice president of operations for Princess Coals.

In other organizational changes, Irvin C. Spotte will be general manager of the Sewell Division. Gene Matthis moves from general superintendent of Princess Elkhorn to general superintendent of Princess Elkhorn to general manager of the Sycamore Division. He is succeeded at Princess Elkhorn by Raymond Bradbury, formerly director of industrial engineering. H. B. Price becomes general manager of The Powellton Coal Division, advancing from general superintendent.

* * *

● Formerly with Mountaineer Coal Co., Worthington, W. Va., Harry Williamson, Jr., has been named general superintendent of mines of Freeman Coal Mining Corp. Thomas L. Garwood has been named chief engineer, and Thomas E. Sanford industrial engineer. Operating and staff departments of Freeman have been brought together into a central office near West Frankfort, Ill.

type, the insulation dries to form a smooth painted surface and gives standard insulating materials as much as 300 times more resistance to breakdown by

R. E. Salvati, president Island Creek Coal Co., received the Erskine Ramsay Gold Medal at the annual banquet of the American Institute of Mining, Metallurgical, and Petroleum Engineers in New York. The citation accompanying the award reads: "For his outstanding contributions and achievements in the development and application of modern technology in underground coal mining and in the preparation of bituminous coal, and for his many years of distinguished leadership within the industry."

* * *

● Kenneth A. Spencer, president of The Pittsburg & Midway Coal Mining Company, Kansas City, Mo., and a director and active member of NCA, died Feb. 19 in Miami Beach, Fla.



Kenneth Spencer

Mr. Spencer formerly was a vice president of NCA and chairman of its Atomic Energy Committee. He was chairman of the board of the Spencer Chemical Co. and a director of a number of major corporations. A graduate of the University of Kansas, he was chairman of the board of trustees and one of the founders of Midwest Research Institute in Kansas City.

electrical arcing. Epoxy resins are a group of plastics known for stability, resistance to moisture absorption and ability to adhere to almost anything.



1.

A CONTINUOUS LOAD ON THE BLADE ALL THE WAY THROUGH A TURN

(Pic. 1) International TD-24 exclusive Planetary Steering permits outside track to turn faster than inside track. You get continuous power throughout an even turn—no backing—faster production.

2.

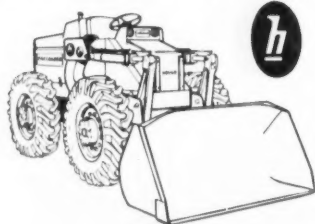
(Pic. 2) One of four TD-24's owned by Earl Reid of E. M. Reid Contracting Company of New Bethlehem, Pa. Note how planetary steering permits a straight cut along a bank without nosing in. This crawler has been in continuous service for two 9-hour shifts since last February with not one minute downtime.

3.

(Pic. 3) This TD-24 is one of four owned by Earl Reid of E. M. Reid Contracting Company, New Bethlehem, Pa. This crawler has been working two 9-hour shifts since February with not one minute downtime, and there has been an absolute minimum of downtime on the other three. Earl says, "The new third roller reduces track wear and helps keep these crawlers moving. If repairs are required, we get excellent service from State."

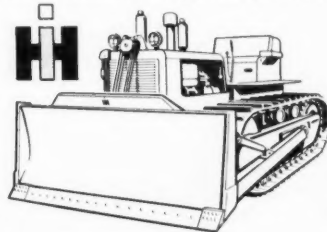
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Learning Something From The Ape

● Preceded by about a million years of gesture and babble, articulate human speech was developed about 25,000 years ago. Gesture language, essentially one and the same in all times and in all countries, preceded picture making and speech. True writing exemplified in the hieroglyphs of Egypt and in the pictograph of Sumaria, is about 5,000 years old. Man spent about 20,000 years drawing pictures and making lines before he began writing sentences composed of words.

The first inkling we have of man being sufficiently advanced in knowledge for making tools is in the Aurignacian period of the age of this earth which dates back about 25,000 years. Indications are that first tools were made of stone and shaped bone, used to club and to pound, to stab and to rip, to tear, probe, etc. and later to make lines that represented letters or words. Language nor tools could have developed far without the other. Language was necessary for coordinating intelligent use of tools. Students of language point out that words in existing languages have arisen from sounds accompanying gestures by early humans while using tools. Acquisition of speech and tool-making were essential to the process

of transforming Ape into Man.

Some scientists believe that deliberate tool-making and transmission of techniques of tool-making demand articulate speech. Other scientists think the social inheritance of tool-making skill depends on observation and imitation. The Ape is today displaying, through intelligent substitution and the faculty of elementary abstraction, the ability to put two or more things together purposely.

Men in industry may find it difficult to picture man so primitive having tools, yet be able only to babble about them in an incoherent way. Others may be overestimating the extent to which special education is necessary to make modern tools.

Technically backward black man in Africa is living in poverty because he is incompetent in today's technically progressive white man's world which engulfs him. American Coal Mining man's market for his product is very near to being engulfed by his technically advanced competitive fuel Industries. Ape-like observation and imitation of advanced industries might get the American Coal Mining Industry off its non-progressive dead center. Some Monkey imitation might help.



Allis-Chalmers HD-21 . . . Marion Center Mining Co., Marion Center, Pa.

Q.

Why do leading mines, year after year, standardize on equipment from Highway?

A.

Mines, whose profits depend on efficient operation, with minimum downtime, know they can depend on Highway! Your mine will give higher production—at lower cost—because of Highway service.

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Allis-Chalmers • Master • Lima • Thor • Heltzel • Gar Wood
Jaeger • Buffalo-Springfield • Ottawa
Rogers Trailers • M-R-S • Lippmann Crushers

Some Dope About Rope

● There are two general classes of rope, the round of popular usage and the flat. The round rope is more adaptable to general use on hoists and elevators, ship cargo winches and mooring lines, while the flat type is for special mine hoists.

This flat rope is made up of round strands, usually without cores, laid side by side and sewed together with annealed wire. They are most commonly used where hoisting is done from very deep shafts and where the twisting of such long lengths might cause serious handicaps. An additional feature is they are frequently tapered to equalize the stress in the rope over its entire length. Of course, it requires a special drum. Round wire rope in the usual form is composed of a number of round wires twisted together to form strands, and these strands twisted together around a core to form a rope. The core may be of either hemp or steel. Hemp adds nothing to the strength of the rope, but it does give flexibility, absorbs shock imposed on the rope, helps to maintain its round shape, and acts as a reservoir for the lubricants used to saturate it. A steel core adds some 10% to its strength, but it decreases its flexibility by about the same ratio. Wire ropes strands are composed of various numbers of wires commonly 4, 7, 12, 24 or 37.

"Lay", as a term descriptive of round wire rope, refers to the manner of twisting the strands. The character of the work for which the rope is made determines the manner in which the wires should be twisted to form a strand, and also the manner in which the strands should be twisted to form a rope. "Regular lay"

rope is that form in which the twist of strands is in the opposite direction from that of the wire composing the strands. This lay is intended to eliminate the twisting tendency of the rope when under tension. Regular lay rope has relatively small rubbing surface, and is subjected to excessive wear over a restricted area.

"Lang lay" rope is that in which the strands are twisted in the same direction as the wires composing the strand. It has a larger rubbing surface than the regular rope, but also has a greater tendency to twist under tension. Lang lay is from 4% to 8% stronger than regular lay rope, but has the one objection that very few men are capable of splicing it. These objections to regular lay and lang lay ropes have been just about eliminated by the development of "preformed" rope, which has the strands preformed to the shape that they will take in the finished rope. Preformed lang lay rope gives the advantage of the larger wearing surface, avoids the objectional twisting tendency and, is much easier to splice than ordinary lang lay rope.

The Choice of Rope

The choice of wire rope is usually made on the rope cost per unit of work accomplished, whether it be the ton hoisted, shifts operated, or any other basis. The factors which affect the rope cost per unit of work accomplished are:

1. Cost of rope.
2. Cost of its installation.
3. Cost of renewals.

The third item involves the purchase and installation of new rope at a time when the old rope can no longer be used. The relation which

the third item bears to the first two varies inversely as the life of the rope.

The wire cost per unit of work accomplished should be figured over a period of time in which the rope has been renewed several times. This method of figuring more nearly approaches the average cost of the particular kind of rope used and is the only fair figure to use in comparison with cost of other ropes for the same duty.

Types of Lay

Regular lay ropes are superior in that their method of manufacture opposes twisting. Lang lay rope is stronger and has more rubbing surface, but to prevent or lessen its twisting tendency requires careful installation and handling. Preformed



Builders of stripping shovels are installing larger sheaves to decrease bending stresses.

wire rope has already been described as embodying the advantages of both regular lay and lang lay ropes.

Flexibility

The quality of flexibility is essential if rope must be frequently bent over rollers or sheaves. Such duty is imposed upon rope used on cranes, derricks, shovels, draglines, winches and elevators. The strength and flexibility of rope depend upon the length of lay, or degree of twist. A long lay rope is stronger, but lacks the flexibility of the shorter lay. Regular lay rope is, ordinarily, more flexible than lang lay, and short lay rope more flexible than long lay. Flexibility is increased by using a larger number of wires per strand and by decreasing the size of the wires.



"Angle" sheaves used to change direction form horizontal to 45° angle to top of head frame. Ample size insures long rope life!

Relative Flexibility of Wire Ropes.

Grade of Flexibility	Type of rope (One hemp core)	Number of strands	Wires per strand
Least	Round strand	6	7
	Flattened strand	6	8
	Haulage use		
Good	Round strand	6	19
	Flattened strand	6	25
	Non-spinning hoisting use	18	7
Best	Extra Flexible	8	19
	Special Flexible hoisting use	6	37

Safety Factor

The load which a wire rope will safely carry is usually figured to be approximately one-fifth of the breaking strength of the rope. In other words, a factor of safety of five is used. A factor of safety of ten to five is used however, for special service, such as the hoisting of men. The accompanying table of safety factors, recommended for general hoisting, is self explanatory.

Factors of Safety Recommended for Hoisting Ropes.

Length of rope in feet	Minimum Safety Factor		Percentage of reduction in service
	When rope is new	When rope is to be discarded	
Less than 500	8	6.4	20.0
500 to 1000	7	5.8	17.0
1000 to 2000	6	5.0	16.5
2000 to 3000	5	4.3	14.0
3000 and more	4	3.6	10.0

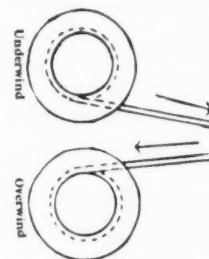
Acceleration

Quick starting of rope under load is inadvisable, because high acceleration stresses develop dangerous conditions within the rope structure, even though they are not usually noticeable on the surface. The load should be applied gradually, and ac-

celeration should take place at a uniform rate. The table showing accelerations ranging from high to low, under widely varying conditions by several large users will give the reader an idea of general practice.

Unreeling and Cutting

The simple act of unreeling sets up some very serious damage unless the work is done right. Never throw loops of the rope over the end of the reel. To do so sets up strains that will result in shortened work life. Place the reel on an axle and pay it off by a straight forward pull. If less than reel length is needed use soft (annealed) wire to develop two "seizings" of about four tight turns on each side of the mark. Then use the cold cut over a metal block, or if you wish, use the cutting torch. Failure to secure the ends results in serious raveling that may extend much farther than you think.



In some cases two ropes are wound on one drum which means that one rope occupies 98% of the grooves while the other rope is paid off such as in balanced hoist work for minerals, etc.






Right Lay—Left Lay

For practically every purpose, with little exception, the right lay is standard. For only certain ropes used in the oil fields are left lay ropes required and for a few drum winding conditions are the left lay ropes of advantage. Some of the considerations for the use of the left lay ropes are sketched in Fig. 1.

Rope For Two Or More Layer Winding

When rope winds in the first layer across the face of a drum, it usually forms a uniform helix. On reaching the flange of the drum, the rope rides upon the last turn and starts winding back across the face of the drum, but falls into the depression of the successive turns of rope on the drum's first layer. To advance across the drum on second layer, the rope, following the grooves or depressions

SAFE LOADS* — FOR WIRE ROPE AND CHAIN

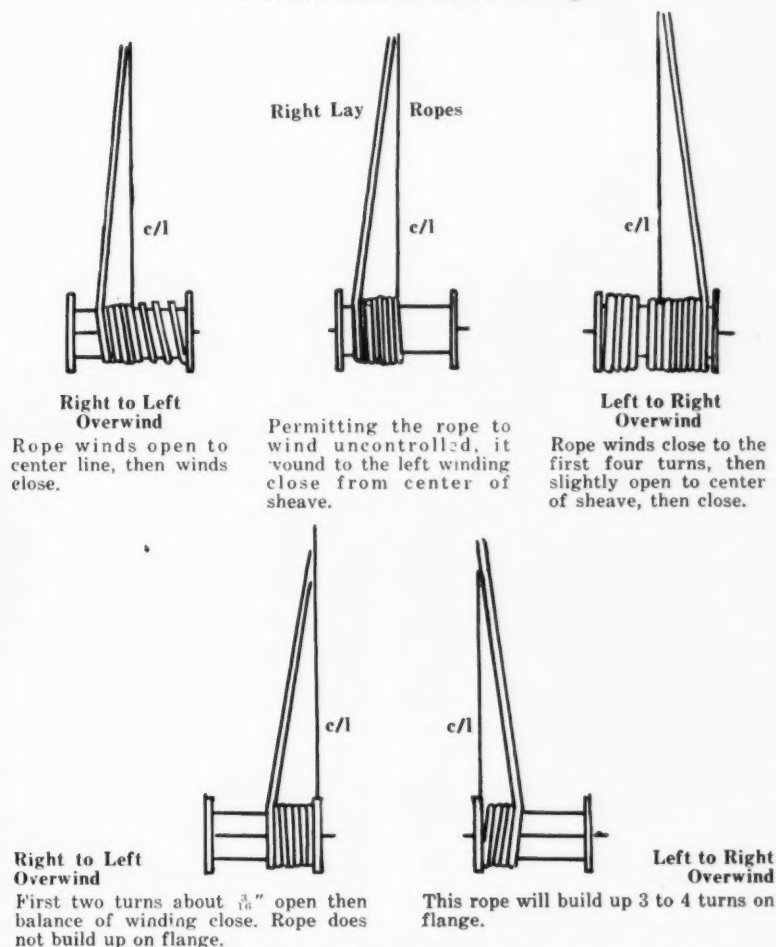
SAFE LOADS FOR WIRE ROPE AND CHAIN															
															
Single Part			Single Part Choker Hitch			Two Parts			Two Parts			Two Parts			
Wire Rope	Alloy Steel Chain	Wrought Iron Chain	Wire Rope	Alloy Steel Chain	Wrought Iron Chain	Wire Rope	Alloy Steel Chain	Wrought Iron Chain	Wire Rope	Alloy Steel Chain	Wrought Iron Chain	Wire Rope	Alloy Steel Chain	Wrought Iron Chain	
1/4"	964#		704#			1220#			1000#			704#			
5/32"		1.3		1	1.8		1.8			1.5			1	1.8	
3/8"	1	2.3	1600#	1540#	2.4	1780#	1.4	3.1	1.1	2.5	1810#	1560#	1.8	1280#	
7/16"	1.8	4	1.4	1.4	3.2	1.1	2.4	5.6	1.9	4.6	1.6	1.4	3.2	1.1	
1/2"		5			4			7			5.7			4	
5/8"	2.8	6	2.2	2.1	4.8	1.8	3.7	8.2	3	6.7	2.5	2.2	4.8	1.8	
3/4"	3.9	7.8	3.2	2.8	6.2	2.6	5.2	10.7	4.4	8.7	3.6	3	6.2	2.6	
7/8"	5.2	10.4	4.3	3.7	8.3	3.4	7	14.4	6	11.8	4.9	4	8.3	3.4	
1"	6.6	13.5	5.7	4.6	10.8	4.6	9	18.7	7.8	17.3	5.3	4.6	10.8	4.6	
1-1/8"		17.8	6.7		14.2	5.4		24.7	9.3		20.2	7.6		14.2	
1-1/4"	9.7	23.	8.3	6.6	18.4	6.6	13	31.9	11.5	10.6	26	9.4	7.5	18.4	
1-3/8"									13.9			11.3			
1-1/2"	13.2		12	9.2		9.6	17.3		16.6	14		13.6	10	9.6	
1-5/8"			14			11.2			19.4			15.9		11.2	
1-3/4"	17		16	12.1		12.8	21.5		22.2	17.5		18.1	12.4	12.8	
2"	20.6		21	15.4		16.8	26.7		29.1	21.8		23.8	15.4	16.8	

*IN TONS UNLESS OTHERWISE INDICATED.

of the rope on the first layer, actually winds **back** a turn in each revolution of the drum and then must cross over **two** depressions of the first layer so as to have a net advance of one turn per revolution of the drum. Fig. 2. This cross over is unavoidable on the second, fourth, sixth, etc., layers and gives rise to severe abuse

at these points due abrasion of the adjacent turns of rope against each other, as well as to severe crushing from the next layer above on these spots. There has been considerable experimental field work done to reduce this abuse, of which the shallow, parallel grooved drums seem worthy of consideration.

Effects of winding ropes on drums as the result of direction of winding



● **New Vocaline 4-Channel Citizens Band Radio Offers Greater Flexibility and Convenience.** A new multi-channel version of the widely-accepted "Commaire" Citizens Band radio has been developed by the Vocaline Company of America, Old Saybrook, Conn.

The new model is called the ED-27M Commaire. It has four separate channels to give the user the convenience and flexibility of a conference phone, while getting uniform performance throughout the entire

22-channel Class D Citizens Band. "With the ED-27M Commaire, you now have more communication versatility than ever", says Ed Manville, Sales Mgr., Vocaline Communication Products. "Now you can talk to all units in your system, over any one of the channels. You can assign each station to a different channel to assure private communication between yourself and that station. Or you can switch to an unused channel if other transmissions are occurring simultaneously with yours."

The ED-27M Commaire, with its unusual flexibility is perfect for a wide variety of communication jobs in business, industry, farms and sports. It features the same precision engineering and audio circuitry as the ED-27, with an improved transmitter for more effective range. The receiver is a crystal-controlled, double-conversion superhetrodyne with a selectivity of 5 kc at points 6 db down and a sensitivity of 0.3 mv. It has the highest audio output of any Class D receiver, 4.5 watts. The ED-27M has Vocaline's patented "Silent-Aire" squelch circuit and transistorized power supply. It is a single crystal receiver, offering high efficiency, greater economy and easy servicing.



The ED-27M Commaire is an integrated receiver-transmitter in a compact, rugged cabinet, ideal for field use. As compared with other classes of communications equipment costing \$1000 and up for each radio unit, a single Commaire ED-27M transceiver sells for \$189.50. Simple antenna installation can be made by the purchaser or local technician can be made by the purchaser or local technician. Complete instructions and license application are packaged with each unit. FCC regulations permit operation of this system by any U. S. citizen over 18 years, provided there is a substantive and purposeful use for a communications system either in business or for personal applications. No technical knowledge is required, no code test or examinations have to be taken. Complete details can be obtained by writing Vocaline Co., of America, Old Saybrook, Conn.

Review And Forecast

By DR. ARTHUR B. CUMMINS, installed Feb. 16, 1960, as President of the Society of Mining Engineers of AIME, a constituent organization of the American Institute of Mining, Metallurgical, and Petroleum Engineers. Dr. Cummins is manager, Mineral and Basic Research, Johns-Manville Corp., Manville, N. J.

I. What kind of a year was 1959 for the American Mining Industry?

All in all, 1959 was a fairly good year for mining, it being supported by a high level of national economy and industrial activity. It was, however a year of considerable complexity in which the activities in various fields of mining were affected to different degrees by economic and political conditions.

The biggest factors were: (1) the strikes affecting the steel and some of the non-ferrous metals industries; (2) the rising tide of mining activities abroad and the increase in importation of products made from minerals (steel, copper and its alloys, flat glass, and numerous others).

As for some highlights, U. S. production of iron ore went down to 60 million tons (the lowest in 20 years), although the production of pig iron and steel was above that of 1958 despite the strike.

Eighty percent of the copper producing industry was down due to strikes for part of the year. The output of copper dropped 16 percent (lowest level in ten years). Aluminum and some other metals were up. There was an 8 percent decline in the production of anthracite coal, but bituminous about held its 1958 level.

In toto, the production of industrial minerals (non-metallics) was high — an improvement over 1958, and in many cases an increase over the best years prior to 1958.

II. What is the Outlook for 1960?

Forecasts predict high industrial activities and prosperity in 1960. (GNP above \$500 trillion,) if this is so, we can expect a good year for mining. But the pattern will be spotty and not all branches of mining will fare equally well.

With strikes somewhat in the background for the time being, the iron

ore and steel industries and the non-ferrous metal industries, may expect heavy requirements, not only to meet the expected new demands, but also to fill the backlogs resulting from the 1959 work stoppages. The picture for zinc is considered favorable with Tennessee coming more to the fore as the leading producer; copper should be in a good position with possibilities for a revival of production in Michigan and the proving of more substantial reserves in Arizona. Aluminum should come through with a new record.

The production of cement has been forecast to probably drop some 3 to 4 percent from the 1959 level. This is based on a slowdown in the Federal highway program and to an anticipated reduction in home construction due to the squeeze on mortgage money. Production of sand, gravel and stone may be expected to parallel that of cement. Most other industrial minerals are expected to be in demand equal to or above 1959 levels, (abrasives, clay, borax, limestones, gypsum, phosphate rock, potash, salt, sulphur).

The major interest in 1960 is the probability that it will be significant in indicating the trend ahead, and what to expect in the next decade.

III. What will the Decade of the 1960's Bring to the Mining Industry?

Many economists predict for the decade 1960-9, a boom period of unprecedented advances. Others foresee difficulties and complications. While these may be expected, let us agree that the curve of progress in general will be upward, and possibly to a fantastic degree. Technological advances, population growth, higher living standards, space age requirements, nuclear power developments, are all expected to accelerate the advance.

It should be recognized first that the demand for mineral raw ma-

terials moves with general economic trends. Thus the mining industry, per se, will not "set the pace", but will follow the (technological, economic and political) developments of the next decade. This is because the role of the mining industries, in the main, is to supply raw materials as required by industry.

Aside from industrial economy, and foremost among the factors that will prescribe the role of the mineral industries in the near term future, is the question of cold war, the approach to the space age, etc.

The mining industry today must become adjusted to meet successfully the changes resulting from the new requirements of the space age. The 1960's will be a period placing great responsibility upon the American mining industry with a challenge to meet an almost certain demand for greater production of most mineral commodities. At the same time there is the requirement of meeting competitive prices of foreign producers. Also the major problem of protecting our future, in reserves and technologies, well beyond the 1960's, indeed into the 21st century and beyond. It seems that tariff protection and import quota restrictions alone cannot be relied upon, in most categories, to meet all of the problems of some phases of our mining industry. It appears more in line to recognize that in most cases we need to sell our products freely among the world wide consumer countries unrestricted by artificial tariff barriers and currency problems.

It is the opinion of most competent mining authorities that if the American economy is basically sound and if it is in reasonable balance with that of the rest of the world, the American mining industry will be capable of handling the many special and different problems which it will have, all in the interests of American and

world prosperity and peace.

Since no one can foresee the future in any significant detail, it is perhaps sufficient to point out some aspects of the mineral industries' future that seem at this time important in considering the 1960's.

1) In any economy and under any set of conditions mineral products and therefore mineral resources will remain of critical importance.

2) Since mineral resources are not created, and once depleted are not renewable, the problems remain of conserving and developing what we have, and devising better ways and means of finding, processing and using mineral materials.

3) The U.S. mining industry has demonstrated, time and again, that it has the reserve and the stamina to survive the downturns of economic setbacks, and bounce back to meet the requirements of industry and the national economy.

4) It may be expected to continue to have this capacity, provided for and support the basic requirements of a sound mineral industry.

If we wish to be a little more specific on the status of some of the major mineral commodities during the 1960's, the opinions of many experts in the various fields indicate:

(a) For iron and steel—continued demand. Iron ore resources in adequate supply, strengthened by improved methods for utilization of lower grade ores. (b) For the next few years, the production capacity of aluminum, nickel, asbestos, etc., will be in excess of demand. (c) Aluminum and magnesium are considered to have significantly greater importance as materials for construction. (d) The markets for copper, zinc and lead and their alloys should expand, and considerable research effort is being expanded in the finding and development of new uses for these metals. (e) Most of the less common metals — tungsten, cobalt, columbium, zirconium, and others are expected to be in greater demand. (f) As for the basic industrial minerals, the U.S. may anticipate in creasing requirements for materials used in construction — cement raw materials, sand, gravel and stone,

gypsum, limestone. (g) Also for the major mineral raw materials for the chemical or process industries—salt, sulfur, clays, also for potash and phosphate. (h) So far as present information goes, we will continue to be dependent in large part on foreign resources for nickel, manganese, chrome, tin, mica, antimony, tungsten and some others. Also to considerable extent for copper, iron ore, lead, zinc, thorium, zircon, columbite-tantalate, cobalt, beryl and some others, because it will remain economic to import some of these mineral raw materials.

In addition to the above, there are listed below four problems which it seems to the writer will be of significant importance in the 1960's.

1) The demand for an adequate supply of properly trained mineral engineers is not being fulfilled. Bachelor degrees in Mining Engineering conferred in 1958 were 220, estimated in 1959, 205; projected for 1960, 190; thereafter,? Currently there are apparently not enough jobs for the full time employment of mining engineers, particularly in exploration work; but this is an unnatural, unhealthy and unsafe national position and presumably will not continue. There is need to emphasize and bring to the attention of better qualified young men the opportunities and satisfactions in a career of minerals engineering. Efforts in this direction are being taken by AIME, the EJC and other agencies interested in professional engineering as related to the mining industries.

2) In the interests of a more sound and permanent mining industry, the mining engineering profession has a better public relations job to do. This entails primarily:

a) Let the public know what mining engineers are doing and emphasize their economic importance.

b) Let the government know the vital importance of minerals and mining in the international "economic battle" of the 60's.

c) Bring the story to and develop the interest of students in mineral engineering.

3) It is highly important that there be established a national min-

eral policy (long term and short term and short term). This involves not only a wise Federal policy on de-policy encouraging the exploration pletion of mineral resources and a and development of our natural mineral resources, but consideration of all national and international problems in the procurement, distribution and stockpiling of mineral materials. This must consider the specific requirements of the basic and strategic minerals and the special cases of lead, zinc, nickel, gold, silver and others.

4) During the 1960's it may be expected that there will be an increased and significant fusion of the mining and chemical industries. This tendency was manifested in the 1960's. There will be more chemical companies going into the mining business and more mining companies going into the chemical business. In general, this crosspollination of interests is inevitable and desirable. Minerals are the raw materials for the inorganic chemical industries. Chemicals and related products are the logical end-uses for many of the materials which are extracted from the earth by mining. The point to emphasize is that this combination of interests is of importance to operators, investors, the general public and the national welfare.

● A handy reference catalog on the complete line of Caterpillar earth-moving equipment and its diesel engines has just been released by Caterpillar Tractor Co. The 20-page, two color booklet is titled "Caterpillar Construction Equipment."

The brochure contains model views and brief specifications of Caterpillar Motor Graders, track-type Tractors, Bulldozers, Rippers, Traxcavators, crawler-drawn Scrapers, wheel Tractors, Scrapers and Wagons; Pipelayers, Controls, Industrial Engines, Electric Sets, Marine Engines and auxiliary equipment.

Copies of "Caterpillar Construction Equipment" may be obtained at Caterpillar Dealerships or by writing to the Advertising Division, Caterpillar Tractor Co., Peoria, Ill., and requesting Form D942.

SEE THIS NEW NO. 944 ON T-DAY

T-DAY IS . . .

MARCH 14th at— Johnny Garneau's Smorgasbord Restaurant, Wm. Penn Highway, Monroeville, Pa. (Rt. 22 East of Pittsburgh, Pa.)

MARCH 17th at— Beckwith Machinery Company
Old Town Road
Clearfield, Pa.

MARCH 21st at— Beckwith Machinery Company
Rt. 219 North
Somerset, Pa.

MARCH 24th at— Beckwith Machinery Company
361 Congress St.
Bradford, Pa.

MARCH 28th at— Beckwith Machinery Company
Buckhannon Pike, Rt. 20 South
Clarksburg, West Virginia

MARCH 31st at— Beckwith Machinery Company
1356 E. 12th Street
Erie, Pa.



First of an all-new line of Caterpillar wheeled loaders . . . a marked departure from other wheel loader design to date . . . will be demonstrated this month. Introduction of the new machines, ranging from 84 to 145 net horsepower, culminates several years of research, engineering and field testing. We sincerely feel that these new wheeled Traxcavators will prove of great value and interest to the coal, construction, housing and allied industries.



Max M. Snyder
General Sales Manager
Beckwith Machinery Company

*Showings 9 a.m. to 6 p.m.
on the above dates and
at locations indicated.*

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GET THE FACTS ON THE NEW No. 944 TRAXCAVATOR

**AT YOUR CATERPILLAR DEALER
Beginning the Week of March 14th**



YOU'RE INVITED..

HERE'S THE *first of a new line of wheel loaders* in the Caterpillar quality tradition

A BOLD NEW WHEEL LOADER DESIGN... the No. 944, with 2 cu. yd. capacity, comes to you from the builder of the best accepted track-type loaders in the field. We're ready to show you how it can bring new wheel loader performance standards to your job. The No. 944 Traxcavator, first of a new line of wheel loaders, will soon be followed by the 1¼ yd. No. 922 and the 2¾ yd. No. 966. From every angle you'll find these machines profit boosters—designed, tested and built in the Caterpillar tradition of efficient operation and long life! Look at the many advantages of the No. 944.

DIESEL OR GASOLINE POWER—choose from two great new 105 HP* engines—a 4-cylinder, turbocharged D330 Cat Diesel—or a 6-cylinder gasoline engine. Both engines provide plenty of power for machine drive and bucket hydraulics.

POWER SHIFT TRANSMISSION—instant finger-tip shifting—forward and reverse or 1st and 2nd speed range. Reverse speeds 25% faster than forward speeds. Travel Range gives 2-wheel drive for roading. Work Range automatically puts power to all four wheels.

LIVE-ACTION HYDRAULICS—a unique matching of engine and converter that insures full "live power" to the bucket controls regardless of the load imposed on the engine by the power train. Bucket features 41° rack back at ground level—automatic kick-out and bucket leveler—extra-long reach—high lift—stable design.

DESIGNED FOR SAFETY, VISIBILITY—lift arms and cylinders are all forward of the operator—give complete freedom of movement no matter how high the bucket is raised. Visibility is unmatched. Dual brakes—left brake pedal stops machine and automatically neutralizes transmission—right brake stops machine with transmission engaged; gives full control when creeping, working on slopes or roading downhill.

RUGGED DESIGN, UNIT CONSTRUCTION—chassis and loader frame feature all-welded integral design. Lift arms are solid steel. High-strength axles withstand severe shocks. Independent removal of engine, transmission and final drives assure easier servicing.

No. 944 BRIEF SPECIFICATIONS

Standard Bucket Capacity (SAE Rating)	2 cu. yd.
Bucket Lift, hinge pin	143¾"
Bucket Reach @ 7' dump height	50¾"
HP (Net)*	105

Speeds (MPH)	Work Range		Travel Range	
	1st	2nd	1st	2nd
Forward	0-3.7	0-7.0	0-12.7	0-24.1
Reverse	0-4.6	0-8.8	0-15.9	0-30.0

Width	93½"	Wheel Base	88"
Weight (Approx.) Lb.	Diesel engine unit		20,780
	Gasoline engine unit		20,440

*For comparative purposes, the maximum rating of the D330 Diesel Engine used in the No. 944 is 135 horsepower.



Easy to get on and off from either side. Step up and sit down—no need to climb over tires—no cluttered deck. Fenders serve as handy platform for routine engine servicing—also protect operator.



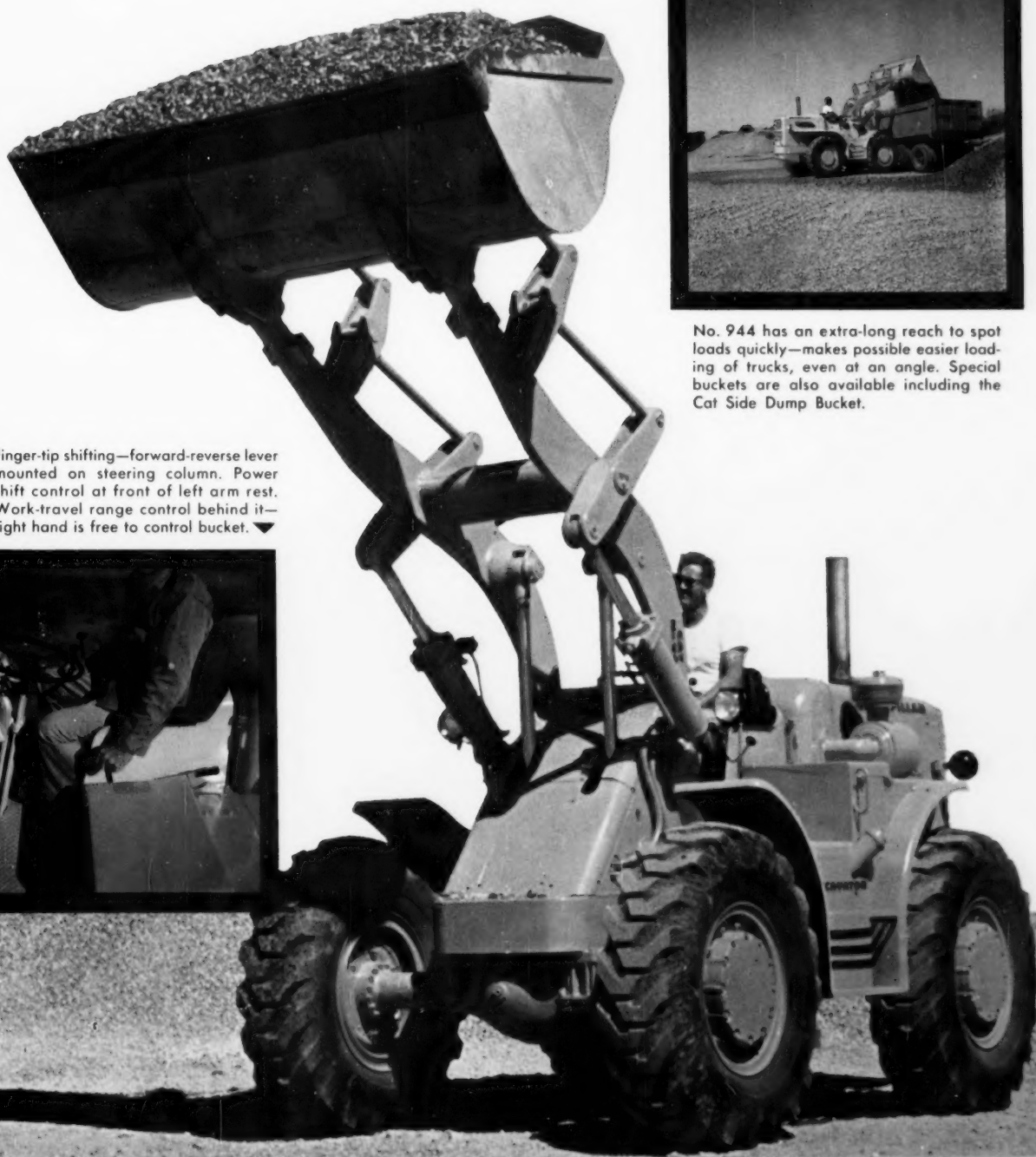
All around visibility is unmatched, especially toward the front of the machine. Note clean, comfortable design of operator area—uncluttered deck. Gauges are grouped in a fiberglass dash panel.



Oscillation of rear axle allows one wheel to drop or raise as much as 11½" keeping all wheels on the ground. Steering system is designed to give precise control and retain this control at road speeds.

A BOLD, NEW WHEEL LOADER DESIGN BY CATERPILLAR

LEARN MORE ABOUT THE CAT No. 944 TRAXCAVATOR



Finger-tip shifting—forward-reverse lever mounted on steering column. Power shift control at front of left arm rest. Work-travel range control behind it—right hand is free to control bucket. ▼



No. 944 has an extra-long reach to spot loads quickly—makes possible easier loading of trucks, even at an angle. Special buckets are also available including the Cat Side Dump Bucket.



**SEE YOUR
CATERPILLAR
DEALER**

**HEAR MORE
ABOUT THE
NEW
No. 944**



Make it a point to see the new No. 944 Wheel Loader at our headquarters. It features new ease of operation, smooth handling and visibility—and operator safety unmatched by any other wheel loader. The quick response of the power train and fast bucket action make it a real producer on the job. Consider the big differences you can't see—differences that show up after hundreds of hours of service. Ability to stay on the job. Low operating costs. Dealer service. Trade-in value.

Final cost. There's a wealth of loader know-how behind the No. 944. It comes from the builder of the best accepted track-type loaders in the field. And coming soon! Two more wheel-type Traxcavators—the No. 922 (1¼ cu. yd.) and the No. 966 (2¾ cu. yd.). Circle the date of March 14 on your calendar now!

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CM-9

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**Don't miss the introduction of the Cat No. 944
... a New Concept in Wheel Loaders. Discover
the many operational and design features setting
new standards for wheel loader performance. See
our ad on page 14 for dates and locations.**

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View of two McCarthy augers recovering abandoned coal at East Kentucky operation. Auger in foreground is older model. New model auger can be seen in left center, between shed and loaded truck. Shed houses complete repair shop.

Augering Abandoned Coal In East Kentucky

● Economy and efficiency now generally prevailing in industry today, has extended to the coal fields of East Kentucky. In the past, abandoned coal lying under grass roots in deep mine operations has been left unmined because the roof could not be held in place. The amount of that lost coal depended on the topography of the area in which the coal lay, loss

being greatest in gradually sloping area.

With the advent and constant improvement of coal augering equipment, land owner with abandoned coal have realized unforeseen and unexpected income. Big, new and rugged coal augers are continuing to produce high tonnages at extremely low costs. Production per man has been

running almost double for the industry. Government figures for past performances show average at 28.15 tons per man produced. The newer machines are consistently producing close to 50 tons per man, in East Kentucky, with the new big McCarthy Model 1500-30-36-42 augers. The 30-36-42 means the auger operates with either 30 inch, 36 inch or

42 inch cutter heads.

Producing in the Hazard #7 seam of coal one of these machines augered 17,122.05 tons in October, 1959. Working two men on the auger and another man facing-up with a bulldozer which also maintained roads, this operation averaged 95 tons per man shift. This same operation produced 64,967.90 tons in a 5 month period, with 36 inch auger and had less than 4 days down time.

Like most Auger users, this operator works around the clock in all kinds of weather, stopping only for routine servicing once per week. In some few instances haulage roads have been washed out.

Costs are about \$2.035 per ton in the railroad car. Citing the complete mobility of the big new augers said the operator "We position the drill quickly. Even in sloppy pits, the drill



Exposed seam of coal made ready by bulldozing.



The new Model auger at operation shown in preceding picture, using 24 inch augers. View also shows auger sled built of standard pipe. On left is a Fairfield conveyor designed for loading out augered coal and comes as standard equipment with the new auger units.



Augers work around the clock, dumping output on the ground when haulage trucks are not available.



Coal dumped on ground is loaded out with A-C HD-11 tractor having $2\frac{1}{4}$ cubic yard bucket—SAE rating. Another A-C tractor working ahead of the auger is bulldozing to expose the coal seam.

moves easily on its own skids and jacks. We have only one bulldozer on the job and the operator keeps the pit clean, maintains roads and still has sufficient time to keep faced-up ahead of the auger."

The newest augers have greatly increased horsepower and much faster carriage return.

On another installation using the newest McCarthy (a 1500-24-30-36), the drill's owners try to follow as closely behind their strip operation as possible. Where this is possible, no face-up is required.

The versatile newer auger can be altered to handle larger or smaller augers (within the machine's range) quickly and at very low cost. During actual mining operations these changes are being made by two men in an hour's time at a cost of about \$7.00.

This operator works all year around regardless of weather. When roads become impassable, the big drills continue to work, dumping the coal on the ground for later loading with a front-end loader. On several job sites the front end loader is a permanent piece of equipment and is pressed into service at any time the trucks begin to run behind the drills.

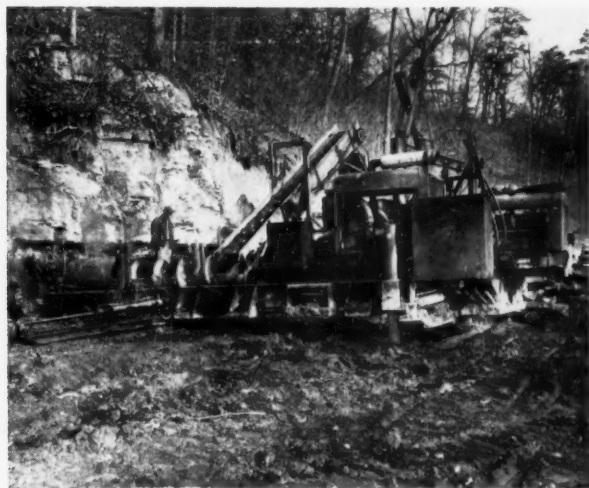
He averages 600 tons in two ten hour shifts with a 24" barrel, and obtains 420 tons with a 30" barrel in only one ten hour shift. His maximum tonnage has hit 496 in ten hours.

On still another operation using the new McCarthy 1500-30-36-42, the owners report a tonnage of 144,292.55 during eleven months of 1959. That figure includes two low months when total tonnage was only 9,200 tons because of weather conditions. This operation involves drilling back into old underground working. In most instances holes are 196 feet deep but it is not unusual to go only two or three auger lengths before hitting old works.

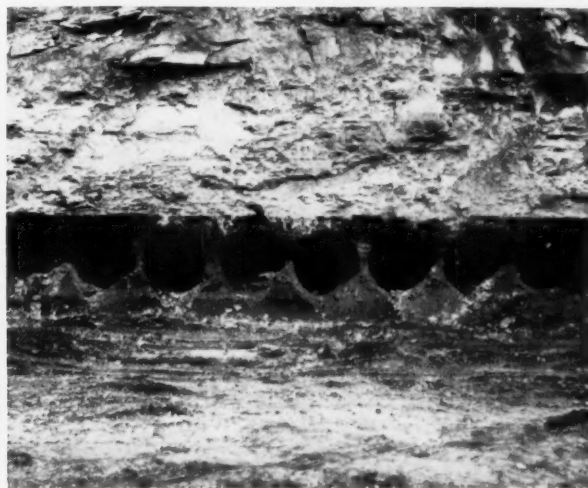
Peak month on this job was October of 1959 when 19,969.25 tons of augered coal were put into railroad cars in twenty-two 24-hour days. During that period labor on the drill plus officers salaries permitted coal to be mined at 70.5 cents per ton.



New type auger at another operation loading into haulage truck. Note auger sled, built of rough wood planking.



This late model auger produced 144,292,055 tons of coal in 1959, working around the clock. In the month of October it produced 15,000 tons with 36 inch augers, averaging 196 foot deep holes.



Seam of coal after augering with 36 inch augers.

Jeffrey Rope Belt Conveyors

Wire rope belt conveyors because of their lightweight construction have a particular application in mining systems where the conveyor must be easily and quickly extended or retracted. They are also used for semi-permanent installations where first cost is a deciding factor and occasionally even for more or less permanent installations where physical and operating conditions are favorable.

The Jeffrey wire rope belt conveyor has a head end and tail end similar to the conventional rigid-type belt conveyor but the intermediate sections differ radically. No cover plates over the return belt are used. Rigid-type angle or channel side frames are replaced by two parallel wire ropes supported by light weight stands usually spaced on approximately 20' centers. In addition to supporting the ropes and spacing them the proper distance apart, these stands carry the conventional type return rolls. Brackets for holding the rolls are located so that belt will not be damaged if a return roll is left out.

Troughing Idlers

Troughing idlers are spaced usually on 5' centers but this spacing as

well as the spacing of the stands carrying the return idlers, can be easily and quickly changed to suit the kind, weight and size of material even on existing installations. Troughing idler consists of a rigid trough-shaped cradle bracket or frame which fastens to the ropes, and three idler rolls mounted in the cradle bracket. The idler may be of the off-set type, which permits removing or replacing individual rolls, of the catenary type in which the rolls are in line and connected together by riveted chain links.

This hinged-joint arrangement causes the belt to take a troughing contour to suit the load, whether heavy or light. The two different idler arrangements are illustrated on the opposite page.

Two types of idlers can be furnished: PERMASEAL precision Timken Roller Bearings Idlers in diameters of 2½", 4" and 5" for belt 24", 30", 36", 42", and 48", or with Commercial Ball Bearing Idlers in Diameters of 2½" and 4" for belt widths of 24", 30" and 36".

PERMASEAL Idlers

The permaseal idler is especially recommended for severe duty in

hauling coal, ore, gypsum, borax, potash or rock. The Jeffrey exclusive double flexible diaphragm seal makes it highly desirable for dusty or wet material. The cut-away view shows the bearing and the two flexible seals. The inner seal rotates with the outer bearings races and retains the lubricant. The outer seal is stationary to exclude dirt. Both are made of synthetic coated, flexible, wafer-thin material and make positive, feather-like contact against micro-finish sealing surfaces. The outer seal is held in contact by a circular multi-fingered, beryllium-copper spring. Positive contact, so light that wear is negligible, is maintained continuously. No belt damaging grease can escape and no bearing-damaging dirt can enter. The bearing is pre-lubricated for year of trouble-free idler service.

Method of clamping rope

The cast steel rope clamp for the cradle bracket has 8½" contact with the rope on either side, for stability and proper alignment. The cradle bracket is set on the ropes and a tapered pin is driven underneath the rope forcing it into and holding it firmly in the clamp. This provides a positive quick-action clamping device that prevents creeping.

The taper pin also has a "no-loss" feature which assures that the pin will always be an integral part of the clamping device. In factory assembly, the taper pin is inserted in the outer part of the rope clamp and a soft rivet is driven through a hole in the small end of the pin and peened over. Thus the taper pin is always part of the bracket and is not lost when the equipment is transferred from one section to another. A recess for the rivets is provided in the casting and there is sufficient clearance on the inner side so that when the pin is driven back to release the rope, the cradle bracket can be freely lifted off. A similar locking type of "no-loss" taper pin is provided also for the wire rope support frames.



(Continued on Page 26)

...for mine operators who are satisfied
with nothing less than the best...
equipment from Highway
is a must!



Allis-Chalmers HD-21 . . . Shawville Coal Company, Inc., Shawville.

...for Highway, not only sells the world's
finest mining machinery, but backs it with
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This Caterpillar D9 Tractor equipped with No. 9S Bulldozer is used to doze spoil material cast up by a shovel, in addition to stripping overburden. Working on coal mining operations near Mount Clare, West Virginia. The overburden is approximately 30 to 35 feet over the coal.

(Continued from Page 24)

Wire Rope Anchors

Wire rope anchors, either fastened to the floor or roof, as illustrated, are used to provide proper tension in the rope. They are usually spaced on 150' to 200' centers depending upon the load carried and belt extension distance. At the head end, the wire ropes can be fastened or anchored to the round or roof just inbye of the head frame.

Wire Rope

The wire rope, either bright or galvanized, is improved plow steel 6 x 19 steel core, regular lay, pre-formed. For ordinary service $\frac{5}{8}$ " diameter rope is used for conveyor widths up to and including 36" and $\frac{3}{4}$ " diameter is used for 42" and 48" widths.

Rope Belt Conveyor Advantages

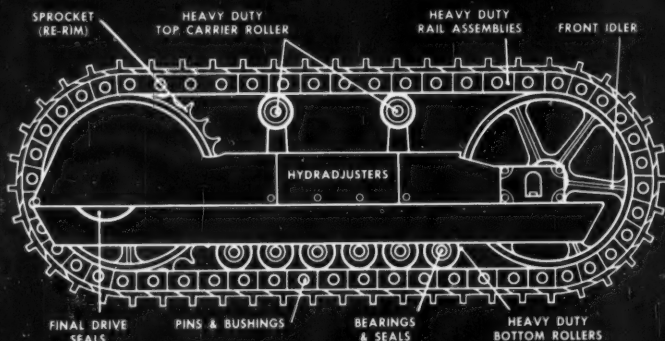
1. Low first cost
2. Low maintenance cost
3. Fewer and lighter parts
4. Quickly extended or retracted
5. No cover plates required for return belt because of less spillage.
6. No belt training idlers needed
7. Longer belt life because of spring effect of wire rope as loads pass over the troughing idlers.
8. Spacing of idlers can be changed easily to suit material and mine conditions even on existing installations.

● Four new pieces of literature covering Allis-Chalmers construction machinery are now available from the company's Construction Machinery Division, Milwaukee, Wisconsin.

1. A 20-page catalog (MS-1357) reviews the recently introduced 340 hp, 30 yard heaped, TS-360 Motor Scraper. Full-color illustrations show the new scraper in action. Various drawings in two colors highlight construction, engineering and operating features. Specifications are included.

2. A new four-page folder (UT-116) gives an illustrated story of the Allis-Chalmers D-10 and D-12 utility tractors. It is complete with product feature, service, simplicity information, and data on matched equipment

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available, plus specifications on both models.

3. A new 16-page catalog (MS-1319) is a revision of a previous catalog covering the Model D Motor Grader. It is complete with cutaway view of the grader, illustrations of its gasoline or diesel engine power plant, photos of various components, structural, design and engineering features. Also shown and discussed are the various attachments and accessories matched to the Model D to match the grader to individual requirements. Specifications are included.

4. An 8-page, two color catalog (MS-1322) covers highlights of engineering, design and construction features of the Allis-Chalmers TS-160 motor scraper, the 155 hp., 9.5 cu. yd. heaped capacity unit in the line of three motor scrapers now available from the company. Photographs and other illustrations help to visually tell the TS-160 story. Specifications are included.



Fred E. Kendall

● Fred E. Kendall has joined The S. K. Wellman Company, Bedford, Ohio, as assistant to the president, according to R. W. Biggs, president. Wellman is a leading manufacturer of heavy-duty sintered metal automotive and industrial clutch and brake linings.



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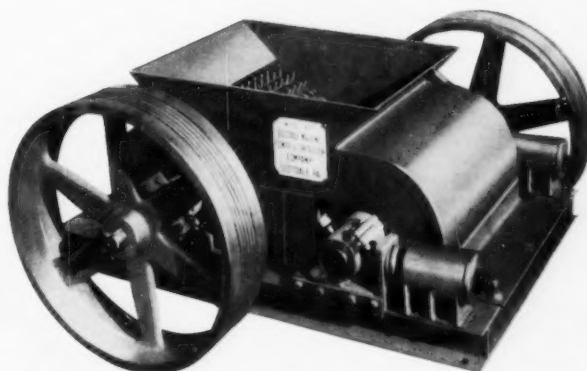
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maintained grooved flywheels. One welded steel hopper is mounted on a 46" x 65" welded steel base. Weighing only 4800 pounds and powered with 2-10 H. P. motors the crusher has a top speed of 150 RPM's with a capacity of 60 to 250 tons per hour. Comes with bronze bushed journal bearings.

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SCOTTDALÉ, PA.

GUYAN MACHINERY CO., Logan, W. Va. stock SCOTTDALÉ CRUSHERS

Mr. Kendall, who will have special assignments for manufacturing and plant operations, comes to Wellman from the Lectroetch Co., a Cleveland firm, where he was vice president and director of research since 1954.

He graduated from Bowling Green State University with bachelors degree in physical science, earned his masters in engineering at the University of Michigan, and PHD at Western Reserve University.

Kendall is active in a number of organizations which include the American Chemical Society, Electro Chemical Society, Sigma Si Alpha Chi Sigma and Chagrin Valley Country Club.



Two units at opposite ends of the size scale of excavators manufactured by Bucyrus-Erie Company, South Milwaukee, Wis., got together for the photographer recently at the River Queen coal mine near Central City, Ky. The River Queen, a model 1650-B stripping shovel weighing 2,400 tons and standing 140 feet high, dwarfs an 11-B Transit Hoe (arrow). The 11-B weighs about 11 tons; its basic capacity is $\frac{3}{4}$ cubic yard. The River Queen is a 55-cubic yard machine; it can remove 80 tons of dirt and rock in a single bite and stack it 100 feet high nearly 300 feet away from the digging point. The 11-B would require about 150 passes just to fill the River Queen's dipper. The 1650-B is one of the largest land excavators in the world. Shovels in the 1650-B series can be equipped with dippers ranging from 40 to 65 cubic yards. Both the model 1650-B and 11-B were introduced by Bucyrus-Erie in 1957.

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- A new, two-color booklet "Ripping With Seismic Analysis," has been released by Caterpillar Tractor Co., Peoria, Ill.

The eight-page brochure tells how earthmoving costs can be reduced by the use of crawler-drawn rippers, instead of blasting, in some materials.

The principles, method and operating technique of seismic analysis are discussed. A table showing the rippability of various materials such as limestone, sandstone, gneiss, caliche, conglomerate, etc., is included.

In seismic analysis, the velocity of shock waves traveling through the subsurface is used to determine the degree of consolidation, or rippability, and the depth of each layer of below-the-surface materials.

For copies of the booklet, contact your nearest Caterpillar Dealer, or write to Caterpillar Tractor Co., Peoria, Illinois. Be sure to include the pamphlet's number 33793, when ordering.

- A new bulletin, descriptive of its Model 600 RP rotary compressor, is announced by Davey Compressor Co., Kent, Ohio. The unit delivers 625 c.f.m. at 100 p.s.i.

Features include a detailed description of operating principles employed in the Davey multiple stage rotary compression system. Emphasis is placed upon patented Davey "Perma-Vane" blades. These are reputed to eliminate delamination and breakage, increase compressor operating efficiency and add to service life. Davey rotary units are said to have 50% fewer operating parts than

(Continued on Page 30)

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- 6—Joy 14BU Loaders, medium pedestal, 7RBE.
- 4—Joy 14BU 3PE Loaders
- 1—Joy 14BU Loader, 7CE—High Pedestal.
- 2—12BU10E Joy Loaders complete with Piggy-backs.
- 2—Joy 12BU Loaders, 9E, latest type.
- 1—Joy 20BU Loader, latest type.
- 2—Joy 11BU Loaders, latest type.
- 1—Joy 8BU Loader, 34" overall height.
- 2—Joy 8BU Loaders, 220 volt AC.
- 1—Joy curved Bar Head, complete.
- 6—Reliance 24-J Motors, 7½ H.P.
- 10—Reliance 38-J Motors, 10 H.P.
- 20—9-J Motors, 4 H.P.
- 2—Goodman 660 Loaders on Crawlers 440 volt DC, like new.
- 1—Goodman 660 Loader on Crawlers, excellent 250 V. DC.
- 1—Goodman 665 Loader on Crawlers, latest type 250 V. DC.
- 1—Goodman 865 Loader 26" hi. Rebuilt. 250 V. DC.
- 4—Joy 8SC Shuttle Cars, Rebuilt.
- 4—Joy 6SC Shuttle Cars, rebuilt, latest type.
- 1—Joy 5SC Shuttle Car, Excellent
- 2—Joy 32E9 Shuttle Cars.
- 2—Joy 32E10 Shuttle Cars, rebuilt.
- 2—Joy 32E15 Shuttle Cars, rebuilt.
- 4—Joy 32E16 Shuttle Cars, rebuilt.
- 2—Joy 42E16 Shuttle Cars, rebuilt.
- 2—Joy CD-22 Drill, on rubber, like new.
- 1—Joy T-2-5 low pan Crawler Trucks, rebuilt.
- 1—Joy T-2-6 low pan Crawler Truck with reel.
- 2—Joy T-1 Standard Crawler Trucks, 220 AC.
- 1—Joy T-1 Standard Crawler Truck, 250 DC.
- 2—Goodman low pan Crawler Trucks, like new latest type.
- 4—Joy 11-B Cutting Machines, like new, 35 and 50 H.P.
- 1—Joy 7-B Cutting Machine, like new, 250 volt DC.
- 2—Goodman 212 Cutting Machines, 19" high.
- 4—Goodman 312 Cutting Machines, 17" high.
- 3—Goodman 412 Cutting Machines, 19" high.
- 1—Goodman Machine on Crawler, 31" high. All hydraulic.
- 6—Goodman 512 Machines with Bugbusters.
- 6—Goodman 612 cutting machines, 250 and 500 volt.
- 1—Lee Norse low vein Machine Carrier on rubber.
- 1—Jeffrey 70 URB rubber tired Cutter. Universal head, perfect condition.
- 1—Joy 11RU Rubber Tired Cutter with bugbusters, Universal heads, like new. 250 V DC.
- 1—Goodman rubber tired Universal Cutter, new 1959. Excellent.
- 2—Joy 10RU rubber tired cutters Universal head, 220/440 volt AC, perfect.
- 6—7AU's on track. Universal head.
- 2—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on Crawlers, 250 volt DC.
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LOCOMOTIVES

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- 2—Jeffrey, 10 ton, type MH-110, 42" and 44" Ga.
- 2—Jeffrey 10 ton type MH-78, 42" & 44" Ga.
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- 1—Jeffrey MH-124, 6 ton, 24" overall height.
- 12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
- 4—Jeffrey, 8 ton, type MH-100, 2½" armor plate frames.
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- 3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
- 1—G. E., 4 ton, type 825 Locomotive, 22" high.
- 10—G.E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
- 1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
- 3—G.E. 10 ton, type 809 Locomotives, 42", 44" and 48" Ga.
- 2—Goodman, type 33, 6 ton, 44" and 48" Ga.
- 3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
- 2—Atlas Battery Locomotives, 36" Ga.
- 1—Atlas Trolley Locomotive, 4 ton, 24" high.
- 2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
- 2—Westinghouse, type 906, 44" and 48" Ga.
- 2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
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- 6—Jeffrey MH-100 Locomotive Units, reasonable.
- 3—Plymouth Diesel Locomotives, 8 and 10 tons, 42" and 44" Ga.
- Locomotive Trucks and Spare Armatures for all the above.

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- 2—Monitor Lines complete with Drums, excellent.
- 1—Allis-Chalmers 5' x 12' Rippflo Vibrator
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- 1—Robins Gyrex Vibrator 4x10.
- 10—Belt and Apron type Loading Booms.
- 6—Shaker Screens
- 1—Robins Car Shakeout.
- 20—Crushers, various sizes—Jeffrey McLanahan & McNally
- 4—Mine Scales, 10 & 20 tons.
- 5—Truck Scales, 25 to 40 tons, late type.
- Feeders, Belt and Drag Conveyors, Car Retarders, etc.

CUTTING MACHINES

- 2—Joy 10RU rubber tired cutters, Universal head, 220/440 volt A.C. Perfect.
- 1—Joy 11RU, rubber tired Cutter, 250 V. DC.
- 1—Goodman rubber tired Universal Cutter, new 1956. Excellent.
- 1—Jeffrey 70 URB Cutter, rubber tired, Universal Head, low vein.
- 2—Jeffrey 29UC Universal Machines on Crawlers.
- 1—Goodman on Crawlers, 31" overall height.
- 3—Baby Goodman 212's, rebuilt, 250 Volt DC.
- 2—Goodman 212 Cutting Machines, 19" high.
- 4—Goodman 312 Cutting Machines, 17" high.
- 3—Goodman 412 Cutting Machines, 19" high.
- 4—Goodman 512's with Bugbusters, like new.
- 4—Goodman 512's, rebuilt, or as removed from service.
- 6—Goodman 612's—250 & 500 V.
- 3—Goodman 112's 220/440 volt AC.
- 1—Joy 7-B Cutting Machine, 250 volt DC.
- 4—Joy 11B Cutting Machines, rebuilt. 35 and 50 H. P.
- 6—7 AU's on track, Universal head.
- 10—Goodman 12AA's and 12AA's, 250 volt DC.
- 2—Goodman 324 Slabbers.
- 2—Goodman 724 Slabbers.
- 2—Goodman, 824 Slabbers.
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- 15—Jeffrey 35B's and 35BB's.
- 2—Jeffrey 29B's on track.
- 10—Jeffrey 29C's, track mounted.
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- 3—300KW, G. E. HCC-6's Rotary Converters, 275 V. DC, like new
- 2—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
- 2—500KW Westinghouse Rotary Converters, 275 volt DC.
- 2—200KW Westinghouse Rotary Converters, 275 V. DC, Newly rewound. (all the above with 6900/13000 and/or 2300/4000 primary transformers)
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- 2—150KW MG Sets, General Electric and Westinghouse, 275 V. DC.
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- 1—200KW MG Set, General Electric, perfect. 275 volt DC.
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- 1—300KW Westinghouse, 600 volt MG Set, rebuilt.
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- 2—500KW HCC-6's Rotary Converters, 6 phase, 600 volt DC.
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- 50 Mine Cars, drop bottom, 48" Ga.
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- 300 Mine Cars, end dump and drop bottom, 20" high, 48" Ga.
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(Continued from Page 28)

most other rotary compressors.

The leaflet contains complete model 600 specifications for both 4-wheel trailer and skid-mounted machines. A list of air tools which can be operated by the compressor is included.

*For bulletin copies, write Davey Compressor Co., Kent, Ohio. Ask for Form E-263.

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120-B Bucyrus-Erie Elec. Drag, 115', 5 yd.
111-M Marion Drag, 100', 4 yd.
1601 Lima, 4 yd., Shovel/Drag
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 26 yd. Elec. Shovel
5480 Marion 18 yd. Elec. H. L. Shovel
151-M Marion 7 yd. Elec. Shovel
170-B Bucyrus-Erie 6½ yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 4½ and 5½ Yd. H. L. Shovels
120-B Bucyrus-Erie 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
1201 Lima 3½ Yd. Standard Shovel
111-M Marion Standard & H. L. Shovels
3500 Manitowoc Standard & H. L. Shovels
54-B Bucyrus-Erie Standard & H. L. Shovels
Model T-650 REICHdrill, Truck Mounted Rotary and Down-The-Hole
Ingersoll-Rand Truck, Mtd. & Crawler Mtd. Drillmasters
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ADVERTISER'S INDEX

MARCH, 1960

Beckwith Machinery	
2nd and 3rd Cover, 14 to 19, 30, 32	
Cleveland Contractors Equipment Co.	28
Davey Compressor Co.	1
Fish, J. T.	29
Highway Equipment Co.	
Front Cover, 8, 25, Back Cover	
Manitowoc Sales & Service Corp.	2, 3
Marion Metal Products Co.	4
Maximon Machine Company, Inc.	26
North American Coal Corp.	28
Northeastern Incorporated	27
Ohio Machinery Co.	15 to 18
Old Ben Coal Corp.	30
Paulick, P. R.	30
Salem Tool Company, The	28
Scottdale Machine, Foundry & Construction Co.	27
State Equipment Co.	6
Swabb Equipment Co., Frank	30, 31
Walker Machinery Co.	15 to 18
Woodings Inc., Robert T.	4

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handling of overburden. Maximum depth of overburden, 107 ft.

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TWO-SHIFT
OPERATION in PITTSBURGH
PARTS and SERVICE
DEPARTMENTS



7 a.m. to 11:15 p.m. Weekdays
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Now You Can Get Pittsburgh Shop Repairs Twice as Fast . . . at No Extra Cost!

To provide you with better and quicker service . . . Beckwith's Pittsburgh Parts and Service Departments have been placed on a double-shift basis. In effect this means that repair jobs at this location can be done in half the number of days without any special increase in rate. Your Caterpillar equipment gets back on the job faster to earn more profits for you.

If you have an assembly or small repair job, such as a master clutch, you can bring it in the late afternoon and it will probably be ready for you the next morning . . . keeping your downtime to only a few hours.

In addition to these advantages on Pittsburgh Shop jobs, our earlier hours permit our Caterpillar-trained field servicemen to be on your job an hour sooner than was possible in the past.

Keep in mind that you can bring your machines in for minor repairs or major re-building any time from 7 a.m. to 11:15 p.m. weekdays. Take advantage of this two-shift operation to reduce your downtime . . . and still enjoy the benefits of experienced Caterpillar mechanics working with specialized tools.



Mike Trugan
Pittsburgh Service Manager

Here's Added Convenience, Faster Service in Ordering and Pick-Up of Cat Parts

Many Caterpillar machine owners appreciate the added convenience of placing their parts orders late in the day or early in the morning. To the owner-operator this can mean valuable daylight time saved for actual machine work hours on the job. Parts can be ordered from Pittsburgh as late as 10 p.m. for pick-up at 7 a.m. the next day.

Our double-shift operation pays off for you in other advantages, too. Our expeditor can work with Caterpillar Parts Depots as late as 9:30 p.m. to speed delivery of parts not ordinarily carried in stock.

On Saturday our Pittsburgh Parts Departments and Shop are open until noon as usual. We sincerely trust you will find this new Beckwith Service of early and late hours helpful to your business.



Frank A. Dunham
Pittsburgh Parts Manager

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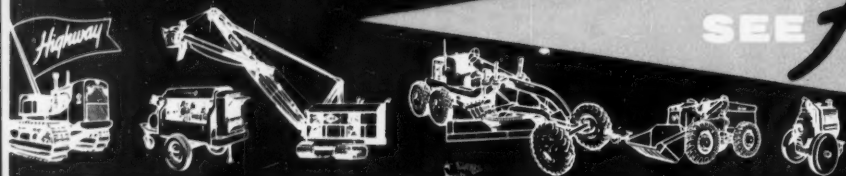


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